State Board of Education Approved
February 2002

CABLING TECHNOLOGY

COURSE DESCRIPTION

This course, which is a part of the information technology infrastructure sub cluster, is designed to equip technicians with the fundamental knowledge, skills, and abilities necessary to install, troubleshoot, and maintain today's networks. Course content presents the principles, which govern the architecture and design of systems and networks for connectivity of video, voice, and data communications. Course content and skill development is delivered by the use of training centers and training aids in the class laboratory on which students complete training exercises.

Prerequisite: Information Technology Infrastructure

Recommended Credit: 1

Recommended Grade Level: 11th or 12th

NOTE:

(1) Course content provides students the opportunity to begin a series of certification examinations through BICSI which is an international telecommunication association. Completion of this course will enable students to take the Installer-Level I and Installer - Level II examinations and creates a foundation for continuing in RCDD certification, which is internationally recognized.

(2) C-STAR certification is being developed by the International Brotherhood of Electrical Workers and should be available in late 2002. The Cabling Technology course will prepare students to take the C-STAR certification once it is available.

CABLING TECHNOLOGY
STANDARDS

1.0 Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

2.0 Students will evaluate career opportunities and career paths within the cabling technology industry.

3.0 Students will demonstrate the principles of safety procedures in the cabling technology industry.

4.0 Students will evaluate the theory of network topologies.

5.0 Students will evaluate individual components that make up networks.

6.0 Students will install cabling systems.

7.0 Students will test cabling networks.

8.0 Students will terminate cabling systems.

CABLING TECHNOLOGY

STANDARD 1.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

LEARNING EXPECTATIONS

The student will:

1.1 Demonstrate dignity in work.
1.2 Participate in SkillsUSA-VICA as an integral part of classroom instruction.
1.3 Adapt to requirements of employment in the cabling technology industry.
1.4 Demonstrate teamwork skills to achieve goals, solve problems, and manage conflict within groups.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

1.1.A Demonstrates attitudes conducive to success, through exhibiting characteristics of honesty, integrity, flexibility, adaptability, patience, objectivity, tolerance, perseverance, and initiative.
1.1.B Researches the Internet for continuing education in the cabling technology industry.
1.2.A Compares the relationship between work ethics and personal job success.
1.2.B Presents information valuable to consumers to school, community, and professional groups.
1.3 Analyzes situations in the workplace and uses problem-solving techniques to solve and create a desirable environment.
1.4.A Participates in job shadowing in an area of cabling technology.
1.4.B Demonstrates job-seeking skills and exhibits employability characteristics required for the information technology and cabling technology industry.

SAMPLE PERFORMANCE TASKS

- Prepare a resume.
- Develop a plan for continuing education in the information technology industry.
- Create a chart showing personal goals for future growth in the information technology industry.
- Participate in various SkillsUSA-VICA programs and/or competitive events.
- Attend a professional organization meeting such as, Chamber of Commerce meeting or local area board of education meeting.
- Participate in the American Spirit Award competition with SkillsUSA-VICA.
- Participate in the Job Skill Demonstration competition with SkillsUSA-VICA.
- Develop a plan of action for an officer candidate or national voting delegate.
- Participate in job shadowing or internship within the information technology or cabling technology industry.

INTEGRATION LINKAGES

SkillsUSA-VICA, *Professional Development Program*, SkillsUSA-VICA, Communications and Writing Skills, Teambuilding Skills, Research, Language Arts, Sociology, Psychology, Math, Math for Technology, Applied Communications, Social Studies, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), Chamber of Commerce, Colleges, Universities, Technology Centers, and Employment Agencies, CompTia, Association of Cabling Professionals (ACP), BICSI

CABLING TECHNOLOGY

STANDARD 2.0

Students will evaluate career opportunities and career paths within the cabling technology industry.

LEARNING EXPECTATIONS

The student will:

2.1 Investigate employment and entrepreneurial opportunities in the cabling technology industry.
2.3 Evaluate personal characteristics and abilities required for working in the cabling technology industry.
2.4 Compare various career options in the cabling technology industry and required certification, education, licensure, and registries.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

2.1.A Researches major occupations within the cabling technology industry.
2.1.B Categorizes major responsibilities for each occupation in the cabling technology industry.
2.2 Researches and develops a projection of industry trends related to career opportunities in the cabling technology industry.
2.3 Profiles personal characteristics that are beneficial to the success of a professional in the cabling technology industry.
2.4 Investigates career options and charts the characteristics, knowledge, skills, and abilities of various careers in the cabling technology industry.

SAMPLE PERFORMANCE TASKS

- Categorize employment and entrepreneurial opportunities (listing salary).
- Develop a profile of career opportunities, education requirements, and projected future employment.
- Develop a personal career plan.
- Appraise professional cabling technology organizations and explain their purposes.
- Incorporate professional terminology into conversation.
- Attend a professional organization meeting.

INTEGRATION LINKAGES

Electronics, Electricity, Computer Skills, Math, Math for Technology, Science, Health, Manipulative Skills, Communication Skills, Teamwork Skills, Language Arts, Research and Writing Skills, Decision Making Skills, Critical Thinking Skills, SCANS, Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Tennessee Occupational Safety and Health Administration (TOSHA), SkillsUSA-VICA, Association of Cabling Professionals, BICSI, CompTia

CABLING TECHNOLOGY

STANDARD 3.0

Students will demonstrate the principles of safety procedures in the cabling technology industry.

LEARNING EXPECTATIONS

The student will:

3.1 Implement safety procedures established by the Environmental Protection Agency (EPA) and Occupational Safety & Health Administration (OSHA).
3.2 Comply with Occupational Safety & Health Administration (OSHA) rules and regulations.
3.3 Analyze and categorize safety and health hazards and their prevention and treatment in the cabling technology industry.
3.4 Exhibit acceptable dress and personal grooming identified by the cabling technology industry.
3.5 Demonstrate first aid practices.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

3.1.A Establishes and maintains a clean safe working environment.
3.1.B Distinguishes and employs preventive measures of ecological, chemical, and physical contaminants.
3.1.C Passes with 100% accuracy, a written safety examination.
3.1.D Passes with 100% accuracy, a performance examination on equipment.
3.2 Maintains cabling tools, equipment, and laboratory in a clean safe condition.
3.3 Develops a plan for prevention of safety and health violations.
3.4 Compares and contrasts acceptable dress and personal grooming for specific jobs in the cabling technology industry.
3.5 Administers simulated basic first aid procedures including treating burns, cuts, and electrical shock.

SAMPLE PERFORMANCE TASKS

- Conduct a safety and health inspection and identify any potential hazards.
- List causes of most common accidents and outline a safety prevention program.
- Participate in the Occupational Health and Safety competitions with SkillsUSA-VICA.
- Outline a safety management program.
- Develop emergency policies for the cabling technology laboratory.
- Role-play proper procedures for treating burns, cuts, and electrical shock according to standards set forth by the American Red Cross.

INTEGRATION LINKAGES

Electronics, Electricity, Computer Skills, Math, Math for Technology, Science, Health, Manipulative Skills, Communication Skills, Teamwork Skills, Language Arts, Research and

Writing Skills, Decision Making Skills, Critical Thinking Skills, SCANS, OSHA, EPA, TOSHA, SkillsUSA-VICA, Association of Cabling Professionals, BICSI. CompTia

CABLING TECHNOLOGY

STANDARD 4.0

Students will evaluate the theory of network topologies.

LEARNING EXPECTATIONS

The student will:
4.1 Analyze three types of communications on networks.
4.2 Analyze networks by observing their topologies.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
4.1.A Incorporates terminology used in video components and systems, voice signals, and data transmission.
4.1.B Discusses the benefits and limitations of various cabling technologies and how they relate to video, voice, and data networks.
4.1.C Discusses wireless options and capabilities for video, voice, and data networks.
4.2.A Visualizes the various components which comprise a network.
4.2.B Appraises how topologies function in order to move data from one point to another.

SAMPLE PERFORMANCE TASKS

- Explain network topologies such as security systems, CATV, telephone systems, bus, ring, star, cluster star, hierarchical star, and wireless.
- The students working in teams may prepare a presentation on using coax, copper, fiber, wireless, or thicknet cabling. Compare and contrast each type of cabling and determine when each should be used. Project future trends in cabling materials. Compile information into an electronic presentation and present to the class, school, or community group.

INTEGRATION LINKAGES

Electronics, Electricity, Computer Skills, Math, Math for Technology, Science, Health, Manipulative Skills, Communication Skills, Teamwork Skills, Language Arts, Research and Writing Skills, Decision Making Skills, Critical Thinking Skills, SCANS, OSHA, EPA, TOSHA, SkillsUSA-VICA, Association of Cabling Professionals, BICSI. CompTia

CABLING TECHNOLOGY

STANDARD 5.0

Students will evaluate individual components that make up networks.

LEARNING EXPECTATIONS

The student will:
5.1 Focus on how individual components function to create the physical layer.
5.2` Select the type of cable for a particular job.
5.3 Evaluate media and connectors for each type of job.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
5.1.A Identifies components within the network.
5.1.B Inspects specific duties or activities of each component.
5.1.C Selects the correct materials for a specific requirement.
5.1.D Appraises the value of amplification.
5.2.A Appraises characteristics of various cable types.
5.2.B Appraises characteristics of various signals.
5.2.C Judges future expectations of network capabilities that will be required.
5.3.A Determines the type of media and how information or data is moved through various cable types.
5.3.B Appraises connectors and the purpose of each.

SAMPLE PERFORMANCE TASKS

- Lists duties of each component and show how each component works to develop a system.
- Develops a chart to show type of cable used for various signals and environments.
- Read specification names for cable.
- Define the various types of cable and explain how they are constructed.

INTEGRATION LINKAGES

Electronics, Electricity, Computer Skills, Math, Math for Technology, Science, Health, Manipulative Skills, Communication Skills, Teamwork Skills, Language Arts, Research and Writing Skills, Decision Making Skills, Critical Thinking Skills, SCANS, OSHA, EPA, TOSHA, SkillsUSA-VICA, Association of Cabling Professionals, BICSI. CompTia

CABLING TECHNOLOGY

STANDARD 6.0

Students will install cabling systems.

LEARNING EXPECTATIONS

The student will:
6.1 Appraise the pathways and structural systems for cabling.
6.2 Evaluate the pulling process.
6.3 Evaluate safety for a cabling project.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
6.1.A Appraises the basic structural components used to transport cable for residential, commercial inside the plant, and commercial outside the plant.
6.1.B Utilizes terminology as related to specific systems and pathways.
6.1.C Installs cabling for a residential building connecting the utility wiring system to completion inside the building.
6.1.D Relates the overall topology of the network within the building to the commercial pathway for the inside plant.
6.1.E Discusses the key components in a Telco room.
6.1.F Compares pathways to run cabling in outside plant pathways.
6.2.A Determines pathways available and evaluates the cable route.
6.2.B Prepares for the pull.
6.2.C Installs cable.
6.3.A Works incorporating safety rules and regulations.
6.3.B Discusses liability issues and how to protect the company from exposure to additional risk and lawsuits.

SAMPLE PERFORMANCE TASKS

- Install cabling pathways within a residence by means of an attic, under the house, and through the wall.
- Install cabling entrances into a residence from above ground entrance and from underground entrance.
- Install in-depth horizontal pathways inside a commercial plant, including, raised floors, conduits, interduct, wire tray and raceways, ceiling or crawl space, walls and pillars, racks and rail systems, and cable management.
- Install commercial pathways outside plant.
- Install a phone system for residential and commercial.
- Runs cable in drop ceilings, in walls, in pillars/columns, in conduits, under floors, in wire trays/raceways, and in Telco rooms.
- Apply safety measures while working and taking in consideration personal safety, pedestrian safety, and company liability.

INTEGRATION LINKAGES

Electronics, Electricity, Computer Skills, Math, Math for Technology, Science, Health, Manipulative Skills, Communication Skills, Teamwork Skills, Language Arts, Research and Writing Skills, Decision Making Skills, Critical Thinking Skills, SCANS, OSHA, EPA, TOSHA, SkillsUSA-VICA, Association of Cabling Professionals, BICSI, CompTia

CABLING TECHNOLOGY

STANDARD 7.0

Students will test cabling networks.

LEARNING EXPECTATIONS

The student will:
7.1 Analyze the network to reveal errors within the installation.
7.2 Test and troubleshoot network media.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
7.1.A Examines the infrastructure of materials used within the network.
7.1.B Identifies cables within the network and checks installation quality.
7.2.A Documents various media and connectors used within the network.
7.2.B Utilizes test equipment such as tone generator and probe, circuit tester, test meter, head set, power meter, OTDR tester, and fiber optic microscope.
7.2.C Determines results of tests and makes corrections.

SAMPLE PERFORMANCE TASKS

- Install various network pathways and use basic steps that will enable the technician to test most types of cabling networks.
- Apply test equipment procedures until the student is capable of reading and determining the response of test.
- Make corrections to network based on test results.

INTEGRATION LINKAGES

Electronics, Electricity, Computer Skills, Math, Math for Technology, Science, Health, Manipulative Skills, Communication Skills, Teamwork Skills, Language Arts, Research and Writing Skills, Decision Making Skills, Critical Thinking Skills, SCANS, OSHA, EPA, TOSHA, SkillsUSA-VICA, Association of Cabling Professionals, BICSI, CompTia

CABLING TECHNOLOGY

STANDARD 8.0

Students will terminate cabling systems.

LEARNING EXPECTATIONS

The student will:
8.1 Evaluate tools and connectors used to terminate cabling.
8.2 Prepare cable for termination.
8.3 Terminate cabling systems.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
8.1.A Selects tools for termination to the proper procedure and type of cable.
8.1.B Categorizes cable and connectors used for termination of cabling.
8.2 Scores and strips jacket from cable, separates pairs into color groups, and secures wires.
8.3.A Terminates cabling using connectors.
8.3.B Terminates cabling using fan out kit.

SAMPLE PERFORMANCE TASKS

- Strip cable without nicking cable or wire.
- Complete punch down.
- Practice using tools until speed is proficient for industry standards.
- Complete terminations using various connector methods.
- Complete terminations using fan out kit.

INTEGRATION LINKAGES

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CABLING TECHNOLOGY

Suggested Resources

BICSI
www.bisci.org
www.netcbt.com/redd-demo.html
CompTia
3 Com
Association of Cabling Professionals (ACP)
Gray Mark
www.cableme.com/html/whatdo.html